10/Cert. Transl.
P. Walker
1-30-03

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS: Kunio Ikui and Yoichi Matsubara

SERIAL NO.: 09/817,241 GROUP ART UNIT: 2879

FILING DATE: March 27, 2001 EXAMINER: LEURIG, SHARLENEL

TITLE: DISPLAY APPARATUS IMPROVED TO REDUCE ELECTROSTATIC CHARGE ON DISPLAY SCREEN AND LEAKAGE OF ELECTROMAGNETIC FIELD OUTSIDE DISPLAY APPARATUS

Hon. Commissioner of Patents and Trademarks,
Washington, D.C. 20231

S I R:

CERTIFIED TRANSLATION

I, Masaaki Iwami of 3-22, Asagaya-minami 1-chome, Suginami-ku, Tokyo, Japan, am an experienced translator of the Japanese language into the English language and I hereby certify that the attached comprises an accurate translation into English of Japanese Patent Application No. 2000-108978 filed on April 11, 2000.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

January 6, 2003

Date

Masaaki IWAMI

[Name of Document] Specification

[Title of the Invention] Display Apparatus

[What is Claimed is]

[Claim 1] A display apparatus, comprising:

a conductive film formed on a display screen, said conductive film having a surface covered with a non-conductive film;

a conductive tape including a conductive sticky layer; and said conductive sticky layer having a specific electrical resistance, said conductive tape being stuck on said non-conductive film via said conductive sticky layer;

wherein said conductive tape is electrically connected to a ground portion of said display apparatus.

[Claim 2] A display apparatus according to claim 1, wherein the sheet resistivity of said conductive sticky layer is in a range of 10 Ω/cm^2 to 1 $K\Omega/cm^2$.

[Claim 3] A display apparatus according to claim 1, wherein carbon is used as a conductive agent of said conductive sticky layer.

[Claim 4] A display apparatus according to claim 1, wherein said non-conductive film is a dielectric substance having a thickness of 250 nm or less.

[Claim 5] A display apparatus according to claim 1,

wherein the sheet resistance of said conductive film is in a range of 1 KΩ/□ or less.

[Claim 6] A display apparatus according to claim 1, wherein said non-conductive film is an anti-reflection film.

[Detailed Description of the Invention]

[0001]

[Technical Field to Which the Invention Pertains]

The present invention relates to a display apparatus, and particularly to a technique suitable for preventing the occurrence of electrostatic charges on a display screen of a display apparatus and leakage of electromagnetic fields from the display screen of the display apparatus.

[0002]

In recent years, from the viewpoint of the fact that display apparatuses used for computers are located close to operators, electromagnetic fields, particularly at a VLF band (2 to 400 KHz) and an ELF band (5 to 2000 Hz), leaked from display apparatuses have come to grow a matter of concern for the health of human bodies. To limit such leakage of electromagnetic fields, a standard MPR-11 and a guideline TCO have been established mainly in Europe, and it has been increasingly needed to develop

display apparatuses adaptable to these standard and guideline.

[0003]

The electromagnetic fields leaked from a display apparatus can be reduced to some extent by canceling it via a circuit, or shielding it by means of a suitable shield plate. On the other hand, there has been disclosed a method of effectively preventing the occurrence of electromagnetic fields from a display apparatus by providing a transparent conductive film on a display screen of the display apparatus and electrically connecting the conductive film to a ground portion of the display apparatus (Technical Report of Television Association, Vol. 1, No. 2, 1995. 1).

[0004]

In this case, the refractive index of an oxide such as ITO (Indium Tin Oxide) or SnO_2, or a metal such as Pd, Au, Cr, or Ti, used as a material of the transparent conductive film, is generally higher than that of air, and therefore, a difference in refractive index between the above oxide or metal and air is large. Accordingly, external light such as illumination light is significantly reflected, so that characters and/or graphics are overlapped to reflection images of external

light, with a result that the characters and/or graphics cannot be desirably displayed on the display screen as a display apparatus. To solve such a problem, there has been generally adopted a method of forming at least one anti-reflection layer on the transparent conductive film.

[0005]

[Problem to be Solved by the Invention]

However, a dielectric oxide such as SiO_2, Al_2O_3, ZrO_2, or TiO_2, used as a material of the anti-reflection film, has a volume resistivity being as high as 10^{10} Ωcm or more, and accordingly, in the case of providing the anti-reflection film on the conductive film, it is difficult to electrically connect the conductive film to a ground portion. In particular, in the case of a display apparatus used for a computer, as described in Japanese Patent Laid-open Nos. Hei 3-266801 and Hei 1-204130, a coating film made from a fluorine compound is sometimes formed on an anti-reflection film for improving the durability of the anti-reflection film and preventing the occurrence of contamination caused by fingerprint or the like, and in such a case, it is further difficult to electrically connect the conductive film to a ground portion.

[0006]

To electrically connect a conductive film covered with an anti-reflection film to a ground portion, there have been proposed a method of removing the anti-reflection film at a portion, to be electrically connected to a ground portion, of the conductive film, and a method of not forming the anti-reflection film by using a mask at a portion, to be electrically connected to a ground portion, of the conductive film.

[0007]

However, since the anti-reflection film is very thinly formed for ensuring the anti-reflection function thereof, according to the former method, it is very difficult to mechanically peel a portion of the anti-reflection film. If such a portion of the anti-reflection film is forcibly peeled, there may occur an inconvenience that the entire films containing a conductive film under the anti-reflection film be peeled. Further, it may be conceived to remove a portion of the anti-reflection film by chemical etching or the like; however, in this case, a large scale etching system is required for carrying out the chemical etching.

[0008]

With respect to the latter method, for example, Japanese Patent Laid-open No. Hei 2-94296 has disclosed a

method of masking, before formation of an anti-reflection film, a portion, to be electrically connected to a ground portion, of a conductive film by using a movable plate or the like. In this method, however, a special jig for masking and a special apparatus for moving the movable plate are required to be provided for each of sizes of display apparatuses, and therefore, a large scale manufacturing system is required to be provided for forming the anti-reflection film. Actually, it is difficult to provide such a large scale manufacturing system for forming the anti-reflection film.

[0009]

A further method by using an alloy solder has been disclosed, for example, in Japanese Patent Laid-open No. Hei 1-286229. However, since a crystallization temperature of a plastic material is generally lower than a melting point of solder, the plastic base may be thermally deformed by soldering. Accordingly, in the case of adopting this soldering method, it takes a lot of labor to control the soldering condition and to perform 100% inspection for products.

[0010]

A further method may be conceived, which is intended to sequentially form a conductive film and an

anti-reflection film on a plastic base, cut the films together with the plastic base into a size corresponding to that of a display screen of a display apparatus, and electrically connect the conductive film to a ground portion by making use of the cut surface of the conductive film. In this method, however, since the conductive film is very thin and thereby the cut area thereof is very narrow and further the conductive film may be broken and chipped at the cut surface and its neighborhood, it is difficult to obtain a positive connection between the conductive film and a ground portion. Further, when the plastic base formed of a thin film is stuck on the display screen of the display apparatus by using a sticky agent or an adhesive, the sticky agent or adhesive may be protruded to cover the cut surface (end surface) of the conductive film. In such a case, it is very difficult to obtain the positive electrical connection between the conductive film and the ground portion.

[0011]

A further method may be conceived, which is intended to stick a conductive sticky tape on a conductive film formed on a display screen for preventing the occurrence of electrostatic charges on the display

screen, and to ground the conductive film by using the conductive sticky film. In this method, however, if a conductive film having a sheet resistance of about 100 Ω/□ to 10 KΩ/□ is used for shielding unnecessary electromagnetic fields, sputtering is generated between the conductive film and the conductive sticky tape due to high electric charges induced on the front surface of the display apparatus, thereby to cause breakage of the conductive film.

[0012]

To solve the above problems, the present invention has been made, and an object of the present invention is to provide a display apparatus capable of preventing the occurrence of electrostatic charges on a display screen and leakage of electromagnetic field from the display screen, and also preventing breakage of a conductive film.

[0013]

[Means for Solving the Problem]

According to the present invention, there is provided a display apparatus, including: a conductive film formed on a display screen, the conductive film having a surface covered with a non-conductive film; and a conductive tape including a conductive sticky layer having a specific electrical resistance, the conductive

tape being stuck on the non-conductive film via the conductive sticky layer; wherein the conductive tape is electrically connected to a ground portion of the display apparatus.

[0014]

According to the display apparatus having the above configuration, the conductive tape is stuck on the non-conductive film via the conductive sticky layer, and accordingly, even if the surface of the conductive film is covered with the non-conductive film (for example, the anti-reflection film made from a dielectric substance), the conductive film can be electrically connected (grounded) to a ground portion of the display apparatus via the conductive tape insofar as the non-conductive film is very thin. As a result, it is possible to suppress the occurrence of electrostatic charges on the display screen and leakage of an electromagnetic field from the display screen. Further, since the conductive sticky layer of the conductive tape has a specific electrical resistance, even if the amount of electrostatic charges on the display screen is rapidly changed, it is possible to prevent the occurrence of sputtering between the conductive film and the conductive tape.

[0015]

[Mode for Carrying Out the Invention]

Hereinafter, an embodiment of the present invention will be described in detail with reference to the accompanying drawings.

[0016]

FIG. 1 is a schematic side view showing a configuration of a cathode ray tube representative of a display apparatus of the present invention. As shown in FIG. 1, a main body (tube body) of a cathode ray tube 1 includes a panel portion 2, a funnel portion 3, and a neck portion 4. Phosphors of red, green, and blue are arranged in a pattern on the inner surface of the panel portion 2, to form a color phosphor screen. An outer conductive film 5 made from, for example, carbon is formed on the outer surface of the funnel portion 3, and an electron gun (not shown) as a source for emission of electron beams is mounted in the neck portion 4. Further, deflection yokes (not shown) for deflecting electron beams in the vertical and horizontal directions are mounted to a cone portion extending from the funnel portion 3 to the neck portion 4.

[0017]

An implosion-protection band 6 for preventing the

implosion of the cathode ray tube is wound around the outer periphery of the panel portion 2. The implosion-protection band 6, which is made from a metal material, is electrically grounded, together with the outer conductive film 5, at the time of assembly of the cathode ray tube receiver. As shown in FIG. 2, a function film 7 is stuck overall on a front surface, that is, a display screen of the panel portion 2. One end side of a conductive tape 8 is provided on an outer peripheral portion (out of an image display range of the front surface of the panel portion 2) of the function film 7, and the other end side of the conductive tape 8 is stuck on the implosion-protection band 6. In addition, although only one conductive tape 8 or a plurality of the conductive tapes 8 may be stuck on the outer periphery of the panel portion 2.

[0018]

FIG. 3 is a sectional view showing one configuration example of the function film 7. The function film 7 is composed of a plastic film 9, a hard coat layer 10, a transparent conductive film 11, and an anti-reflection film 12.

[0019]

The plastic film 9, which is the base of the

function film 7, is made from a plastic material such as polyethylene terephthalate, polycarbonate, or polymethyl methacrylate. The thickness of the plastic film 9 can be suitably selected but may be generally in a range of 50 to 250 μm from the viewpoint of easy handling thereof or the like.

[0020]

The hard coat layer 10 is provided for reinforcing the wear resistance of the plastic film 9, thereby protecting the surface of the plastic base from being damaged. The hard coat layer 10 is made from acrylic resin, silicon resin, melamine resin, or epoxy resin.

[0021]

The conductive film 11 has a function of preventing electostatic charge on the front surface of the panel portion 2, and a function of preventing leakage of an electromagnetic field to the front surface of the penal portion 2. The conductive film 11 is provided on the hard coat layer 10 by forming a film of an oxide such as ITO or SiO_2 or a metal such as Pd, Au, Cr, or Ti to a thickness of 1 to 500 nm by, for example, a sputtering process.

[0022]

The anti-reflection film 12 is provided for

preventing the reflection of light from the front surface of the panel portion 2, thereby enhancing the visibility of a display image. The anti-reflection film 12 is provided on the conductive film 11 by forming a dielectric oxide such as SiO_2, Al_2O_3, ZrO_2, or TiO_2 to a thickness of 10 to 200 nm by, for example, a PVD (Physical Vapor Deposition) process such as a vacuum vapor deposition process, an ion plating process, or a sputtering process.

[0023]

It is to be noted that the anti-reflection film 12 may be of a multi-layer structure of a stack of two layers or three or more layers.

[0024]

FIG. 4 is a sectional view showing a configuration example of the conductive tape. Referring to FIG. 4, the conductive tape 8 is composed of a conductive tape base 13 and a conductive sticky layer 14. The one end side and the other end side of the conductive tape 8 are stuck on the function film 7 and the implosion-protection band 6 (ground portion) via the conductive sticky layer 14, respectively.

[0025]

The tape base 13 is made from a conductive material

such as a metal. Preferably, the tape base 13 is made from a metal exhibiting a suitable bending workability when being formed into a thin shape, such as copper or aluminum. Additionally, the tape base 13 may be formed by coating the surface of a plastic tape with a conductive metal by, for example, a vacuum vapor deposition process, a sputtering process, or a plating process.

[0026]

The conductive sticky layer 14 is, as described above, electrically connected to the conductive film 11 via the anti-reflection film 12 formed into a thin-film shape. The conductive sticky layer 14 is formed by preparing a paste by mixing a fine conductive agent in the form of particles, fibers, or powders in a sticky agent such as acrylic resin, epoxy resin, or polyimide resin, and coating one surface of the tape base 13 with the paste. The conductive sticky layer 14 has a specific electrical resistance. Concretely, a resistance per 1 cm^2 in the thickness direction (sheet resistivity) of the conductive sticky layer 14 is in a range of 10 Ω to 1 KΩ /cm^2, preferably, 10 Ω to 500 Ω/cm^2, more preferably, 10 Ω to 200 Ω/cm^2. In general, a metal may be regarded as a conductive agent mixed to a sticky agent; however, the use of a metal having a very low sheet resistivity makes

it difficult to give a specific electrical resistance to the conductive sticky layer 14. Accordingly, carbon is preferably used as the conductive agent because it is easy to adjust the electrical resistance and to give a desired electrical resistance to the conductive sticky layer 14.

[0027]

In the cathode ray tube having the above-described configuration, one end side of the conductive tape 8 is connected to the function film 7 having the stacked structure of the conductive film 11 and the anti-reflection film 12 via the conductive sticky layer 14, and the other end side of the conductive tape 8 is connected to the implosion-protection band 6 via the conductive sticky layer 14. As a result, the conductive film 11 is electrically connected to the implosion-protection band 6 via the conductive tape 8. In this case, the anti-reflection film 12 is made from a dielectric oxide such as SiO_2, which is an insulating material; however, if the thickness of the anti-reflection film 12 is very thin, a current flows between the conductive film 11 and the conductive tape 8. In particular, in this embodiment, since the thickness of the anti-reflection film 12 is very thin (250 nm or less) for satisfying the

function thereof, a current flows between the conductive film 11 and the conductive tape 8 although the anti-reflection film 12 is interposed therebetween.

[0028]

As a result of experiment made by the present inventors, it was confirmed that, assuming that the thickness of the anti-reflection film 12 is set to 100 nm, a current of about 15 mA/cm^2 flows at a voltage of 0.2 V in accordance with a formula of space-charge limited current. Further, when the conductive film 11 was made to face to the conductive sticky layer 14 via the anti-reflection film 12 (dielectric substance) having a thickness of 100 nm, 50 nF per 10 cm^2 was observed.

[0029]

In this way, in the cathode ray tube 1, the conductive film 11 can be retained to ground together with the implosion-protection band 6 by electrically connecting the conductive film 11 to the implosion-protection band 6 via the conductive tape 8. As a result, it is possible to prevent the occurrence of electrostatic charges on the surface of the panel portion 2, and to effectively prevent leakage of an electromagnetic field generated in the cathode ray tube by suitably selecting the sheet resistance of the conductive film in a range of

100 Ω/□ to 10 KΩ/□. Further, by giving a suitable electrical resistance to the conductive sticky layer 14 of the conductive tape 8, it is possible to prevent the occurrence of sputtering between the conductive tape 8 and the conductive film 11 even if the amount of electric charges on the surface of the panel portion 2 is rapidly changed, and hence to prevent the conductive film 11 from being broken due to the sputtering.

[0030]

[Examples]

[Preparation of Function Film]

A function film 7 was prepared in accordance with the following procedure. A plastic film 9 formed of a polyethylene terephthalate sheet having a thickness of 188 μm was coated with an ultraviolet curing type acrylic resin to a thickness of about 10 μm, followed by ultraviolet curing of the coating resin, to form a hard coat layer 10 on the plastic film 9. A conductive film 11 was formed on the hard coat layer 10 by depositing ITO (Indium Tin Oxide) on the hard coat layer 10 to a thickness of 130 nm by a sputtering process, and an anti-reflection film 12 was formed on the conductive film 11 by depositing SiO_2 on the conductive film 11 to a thickness of 100 nm by the sputtering process.

[0031]

[Sticking of Function Film]

The function film 7 thus prepared was stuck on a front surface of a panel portion 2 of a cathode ray tube 1 as shown in FIG. 1. The sticking of the function film 7 was performed by coating a back surface (opposed to a surface covered with the hard coat layer 10) of the plastic film 9 as the base of the function film 7 with an acrylic resin based adhesive, followed by drying of the adhesive, and the back surface of the plastic film 9 coated with the adhesive was overall brought into tight-contact with the front surface of the panel portion 2.

[0032]

[Preparation of Conductive Tape]

A conductive tape 8 was prepared by forming a conductive sticky layer 14 on one surface of a tape base 13 made from copper. To be more specific, a material obtained by mixing carbon particles representative of a conductive agent in an acrylic resin based sticky agent was stacked on the tape base 13, to form the conductive sticky layer 14 on the tape base 13. The sheet resistivity of the conductive sticky layer 14 was 30 Ω/cm^2.

[0033]

[Sticking of Conductive Tape]

One end portion and the other end portion of the conductive tape 8 thus prepared were stuck on the function film 7 and an implosion-protection band 6 (ground portion) at positions on the outer periphery of the panel portion 2, respectively. The contact area between the function film 7 and the conductive tape 8 was set to 15 cm^2.

[0034]

Here, if a film made from a fluorine compound or the like is formed on the anti-reflection film 12 of the function film 7, the fluorine compound or the like may be removed, before sticking of the conductive tape 8, by subjecting the surface of the function film 7 to a high frequency corona treatment performed at a discharge amount of 35 to 250 $W/m^2/min$, preferably, 70 to 150 $W/m^2/min$. As a result, the wettability of the surface of the function film 7 can be improved. This makes it possible to enhance the adhesiveness between the function film 7 and the conductive tape 8, and hence to stabilize the quality.

[0035]

[Comparative Example]

The same procedure as that in Inventive Example was

repeated, except that the sheet resistivity of the conductive sticky layer 14 of the conductive tape 8 was set to 0.3 Ω/cm^2, to prepare a cathode ray tube for comparison.

[0036]

[Experiment for Evaluating Durability]

The durability of each of the cathode ray tubes prepared in Inventive Example and Comparative Example was evaluated by forcibly causing discharges in the cathode ray tube so as to repeatedly generate high electric charges on the surface of the panel portion, and measuring a resistance between the conductive film and the band (including the sheet resistance of the conductive film) at each of specific numbers of discharge. The evaluated results are shown in Table 1.

[0037]

[Table 1]

Number of discharge	0	100	200	500	1000
Inventive Example	362 Ω	291 Ω	278 Ω	378 Ω	255 Ω
Comparative Example	307 Ω	2 MΩ	∞	-	-

[0038]

As is apparent from Table 1, for the cathode ray tube prepared in Inventive Example, the resistance was

little changed and the conductive film was not broken even after the discharge was repeated by 1000 times. On the contrary, for the cathode ray tube prepared in Comparative Example, the resistance was significantly increased after the discharge was repeated by 100 times, and the resistance became infinite and the conductive film was broken after the discharge was repeated by 200 times.

[0039]

Here, the reason why the cathode ray tube prepared in Inventive Example was desirably evaluated will be described with reference to an equivalent circuit shown in FIG. 5. In this figure, a capacitance between the inner surface of the panel portion and the conductive film of the function film is designated by C1; a capacitance between the conductive tape and the conductive film is designated by C2; a sheet resistance of the conductive film is designated by R1; a resistance of the anti-reflection film (dielectric substance) is designated by R2; and a resistance of the conductive sticky layer is designated by R3.

[0040]

When a discharge is generated in the cathode ray tube prepared in Inventive Example, as shown by the

equivalent circuit of FIG. 5, a potential generated from the inner surface of the cathode ray tube is divided by C1 and C2 and further divided by R1 and R2. Accordingly, a potential applied between both ends of R2 and C2 is suppressed, to thereby avoid the occurrence of sputtering between the conductive film and the conductive tape. As a result, even if discharges are repeatedly generated in the cathode ray tube, the conductive film is never broken.

[0041]

However, if the value of R3 becomes excessively large, a potential between the conductive film and the implosion-protection band becomes higher, with a result that a discharge may be caused therebetween. Accordingly, in consideration of this regard, the value of R3 should be selected. In addition, as a result of experiments made by the present inventors, a discharge was observed between the conductive film and the implosion-protection band under a condition of R3 = 10 KΩ.

[0042]

Further, in the cathode ray tube prepared in Inventive Example as compared with a cathode ray tube with no conductive film 11, it was confirmed that an electromagnetic field in a VLF band was reduced from 2.37 V/m to 0.75 V/m, and an electromagnetic field in an ELF

band was reduced from 25.4 V/m to 5.25 V/m.

[0043]

By the way, in the above-described embodiment, the conductive tape 8 is prepared by forming the conductive sticky layer 14 overall on one surface of the tape base 13; however, the conductive sticky layer 14 may be formed only at portions to be adhesively bonded to the function film 7 (anti-reflection film 12) and the implosion-protection band 6, or only at a portion to be adhesively bonded to the function film 7. In the case where the conductive sticky layer 14 is formed only at the portion to be adhesively bonded to the function film 7, the electrical connection between the conductive tape 8 and the implosion-protection band 6 may be performed by soldering. Further, the other end side of the conductive tape 8 may be stuck on the outer conductive film 5 formed on the outer surface of the funnel portion 3, as the ground portion of the cathode ray tube other than the implosion-protection band 6.

[0044]

In the above-described embodiment, the present invention is applied to a cathode ray tube; however, the present invention is not limited thereto but may be applicable to another display apparatus such as a plasma

display.

[0045]

[Effect of the Invention]

As described above, according to the display apparatus of the present invention, since the conductive sticky layer is provided on the conductive tape and the conductive tape is stuck on the non-conductive film via the conductive sticky layer, the conductive film covered with the non-conductive film can be electrically connected (grounded) to a ground portion via the conductive tape, and also the occurrence of sputtering between the conductive film and the conductive tape can be avoided by giving a specific electrical resistance to the conductive sticky layer. As a result, it is possible to prevent the occurrence of electrostatic charges on a display screen and leakage of an electromagnetic field from the display screen, and also to prevent breakage of the conductive film.

[Brief Description of the Drawings]

[FIG. 1]

FIG. 1 is a schematic side view of a configuration of a display apparatus according to an embodiment of the present invention.

[FIG. 2]

FIG. 2 is a sectional view of an essential portion of the display apparatus according to the embodiment of the present invention.

[FIG. 3]

FIG. 3 is a sectional view of a function film according to the embodiment of the present invention.

[FIG. 4]

FIG. 4 is a sectional view of a conductive tape according to the embodiment of the present invention.

[FIG. 5]

FIG. 5 is a diagram of an equivalent circuit according to the embodiment of the present invention.

[Explanation of Reference Numerals]

1 … cathode ray tube, 2 … panel portion, 3 … funnel portion, 4 … neck portion, 5 … outer conductive film, 6 … implosion-protection band, 7 … function film, 8 … conductive tape, 11 … conductive film, 12 … anti-reflection film, 13 … tape base, 14 … conductive sticky layer

[Name of Document] Abstract of the Disclosure

[Abstract]

[Object] To provide a display apparatus capable of preventing the occurrence of electrostatic charges on a display and leakage of an electromagnetic field from the display screen, and also preventing breakage of a conductive film.

[Solving Means] A function film 7, which has a transparent conductive film and a anti-reflection film covered with the conductive film, is stuck on a front surface of a panel portion 2 of a cathode ray tube. The conductive tape 8 is provided with a conductive sticky layer having a sheet resistivity in a range of 10 Ω/cm^2 to 1 $K\Omega/cm^2$. One end side and the other end side of the conductive tape 8 are stuck on the function film 7 and an implosion-protection band 6 via the conductive sticky layer, whereby the conductive film is electrically connected (grounded) to the implosion-protection band 6 via the conductive tape 8.

[Selected Drawing] FIG. 2